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ABSTRACT

Research in status attainment has shown that whether or not a student is enrolled in a high school college preparation curriculum has important consequences for his educational attainment. Vocational education literature suggests that differences between non-college tracks can also result in differential educational attainments for high school students. In addition, a comparison of two educational attainment models (one which includes detailed measures of curriculum and one which employes the traditional college/non-college distinction) indicates: (1) there are substantial differences between non-college tracks, but (2) these differences do not add appreciably to the explanatory power of conventional attainment models. It can be concluded that a detailed knowledge of curriculum placement has some value in explaining race and sex differences in attainment, but that only research specifically concerned with high school effects on attainment need employ the more detailed measure of curriculum enrollment. (Author/EB)

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Beyond the Academic, Non-Academic Dichotomy:

High School Curriculum Effects and Educational Attainment

Grant No. NIE-G-78-0210

Joel Gelb

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Introductory Statement

The Center for Social Organization of Schools has two primary objectives: to develop a scientific knowledge of how schools affect their students, and to use this knowledge to develop better school practices and organization.

The Center works through four programs to achieve its objectives. The Policy Studies in School Desegregation program applies the basic theories of social organization of schools to study the internal conditions of desegregated schools, the feasibility of alternative desegregation policies, and the interrelation of school desegregation with other equity issues such as housing and job desegregation. The School Organization program is currently concerned with authority-control structures, task structures, reward systems, and peer group processes in schools. It has produced a large-scale study of the effects of open schools, has developed Student Team Learning instructional processes for teaching various subjects in elementary and secondary schools, and has produced a computerized system for schoolwide attendance monitoring. The School Process and Career Development program is studying transitions from high school to post secondary institutions and the role of schooling in the development of career plans and the actualization of labor market outcomes. The Studies in Delinquency and School Environments program is examining the interactions of school environments, school experiences, and individual characteristics in relation to in-school and later-life delinquency.

This report, prepared by the School Process and Career Development program, is part of the program's examination of the effects of high school curriculum on educational attainment.

Abstract

Research in status attainment has shown that whether or not a student is enrolled in the college preparatory curriculum in high school has important consequences for his/her educational attainment. Vocational education literature suggests that differences between non-college tracks can also result in differential educational attainments for high school students. An analysis of the results of including a detailed measure of curriculum placement in a path model of educational attainment is conducted using data taken from the National Longitudinal Study of the High School Class of 1972. This model is compared to one which employs the conventional curriculum variable, which distinguishes between college and non-college track students only. We find that (1) there are substantial differences between non-college tracks, but (2) these differences do not add appreciably to the explanatory power of conventional attainment models. A detailed knowledge of curriculum placement is shown to have some value in explaining race and sex differences in attainment, but the findings suggest that only research specifically concerned with high school effects on attainment need employ the more detailed measure of curriculum enrollment.

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Much evidence, both theoretical and empirical, suggests that whether a student is assigned (or selects) a college preparatory track rather than the other curricula available in high school is vitally important for that student's later educational and (hence) occupational attainment. From a theoretical perspective, Talcott Parsons (1959) has argued that a major function of educational institutions is to "select and allocate" youth to appropriate adult roles. The chief mechanism by which he sees schools fulfilling this function is tracking students--mainly between college preparatory and other curricula. Turner (1960) also holds that the key to later attainment lies in enrollment in the college "stream," whether through "sponsorship" as in Britain or continual "contest" as in America. More recently, Rosenbaum (1976) has likened the American attainment process to a "tournament" in which "losers" are permanently eliminated from competition; and the competition in high school is for placement in the college track.

Coleman et al.'s (1966) widely validated conclusion that between-school differences do not have much impact on educational attainment indirectly supports these theorists. Coleman's finding implies that if structural differentiation has consequences for attainment, this differentiation will occur mostly within the school. Curriculum tracking is a wide-spread and pervasive form of within-school student differentiation; thus, one ought to look at the results of sorting students into separate tracks in high school. Heyns (1974) argued in this vein as a theoretical backdrop to her empirical study of the difference between college track students and those in other tracks.[1]

Other empirical studies illustrate the importance of the college/

non-college curriculum division for a number of outcomes. These include most of the important variables in status attainment research which follow curriculum placement in an individual's academic career: College attendance, performance in college, educational plans, access to counseling, type of peers, parent, teacher and peer encouragement for educational aspirations, intellectual self-worth, occupational aspirations, intelligence, and so on. (Alexander, Cook, and McDill, 1978; Alexander and Eckland, 1974; Alexander and Eckland, 1975; Alexander and McDill, 1976; Cicourel and Kitsuse, 1963; Folger and Nam, 1965; Hauser, Sewell and Alwin, 1976; Heyns, 1974; Jencks, et al., 1972; Ramsoy, 1965; Rosenbaum, 1975; Rosenbaum, 1976; Schaefer and Olexa, 1971). In general, these studies have concluded that placement into a college or non-college curricula is an important determinant for these outcomes even net of differences in student background characteristics across curricula. These studies have also investigated the determinants of curriculum placement itself, and have generally found that curriculum serves as an important mediator of background characteristics as well as an independent contributor to later outcomes, and that it tends to be a somewhat important avenue for the transmission of parental status to the next generation (but see Heyns, 1974).

The most recent of these studies (Alexander, Cook, and McDill, 1978) controlled for a wide variety of background socioeconomic characteristics, as well as for ability, motivations, achievements and social supports measured while the student was in the ninth grade (isolating those effects due solely to enrollment in a college track in high school from possible prior advantages). The study found that college track enrollment still has very large effects on educational goals, achievements, and goal-

oriented behaviors. This study, as well as the others cited above, makes clear that important consequences result from enrollment in the college track.

But what of enrollment in other tracks besides the college preparatory? A more detailed examination of high school curricula represents an extension of the concerns which motivated researchers' study of the college track. Parsons, for instance, though confining his discussion to college/non-college track differences, does not argue that this is the only relevant distinction, but rather that it is merely "the main dividing line" (1959: 71). And the non-college tracks do mirror (on a smaller scale) the same type of differences in purpose, composition and effect as separate college and other tracks. Thus they are specifically designed to place students into different adult roles (Gilli, 1976; Kaufman and Lewis, 1968) and there are differences between tracks in student characteristics and attainments.

Using a variety of sets and sub-sets of curricula and working at various levels of aggregation, researchers have found at least moderate differences (and often substantial ones) when comparing the "tracks" on such characteristics as ability, SES, and race and sex composition (Bachman, 1972; Cicourel and Kitsuse, 1963; Echternacht, 1976; Evans and Galloway, 1973; Flanagan, et al., 1964; Grasso, 1975, 1977; Grasso and Shea, 1977; Kaufman et al., 1967; Lecht, 1974; Somers, 1971; Steele, 1974). Students in the different curricula have also been found to have different aspirations and expectations about college attendance. Grasso and Shea (1977) report that only 23% of vocational but 44% of general track white males aspire to four or more years of college (as do 91% of college track students). (See also Cicourel and Kitsuse, 1973; Ramsoy, 1965; and Rosenbaum, 1976).

Many non-college track students, despite being in programs designed to prepare them to enter the labor market, do go on to further education. Somers (1971) finds that over half of all non-college track high school graduates get some post-high school education. In addition, the rate at which these students go on to higher education varies between the tracks; both Kaufman et al. (1967) and Somers (1971) find a 25% difference in the proportion of students who attend college between the top and bottom non-college tracks, though they disagree radically on the actual percentage who obtain additional education and which curricula are high and low. These differences in educational attainment have been further explored through regression techniques which allow the effects of other variables to be controlled (Carbine, 1974; Grasso, 1975, 1977; Grasso and Shea, 1977; Somers, 1971). Although the findings of the various studies are somewhat contradictory (in part for reasons discussed below), in general, differences in attainment have been found to persist even after relevant controls are introduced. Thus Grasso and Shea (1978) find that after controlling for aptitude, SES and area of residence at age 14, "vocational" and "commercial" track white male students attain one-half and one-quarter years less schooling (respectively) than general track students, though only the vocational curriculum coefficient is significant.

Thus it seems that the specific non-college curriculum that a high school student enrolls in does affect his/her subsequent educational attainment. However, the studies cited above do not lead to a clear understanding of the nature and magnitude of this effect, primarily due to deficiencies in the data. Carbine (1974), Grasso (1975, 1977), and Grasso and Shea (1977) could not fully separate the students by track because the "Parnes data" they employ allows students to choose only between academic,

general, commercial, and vocational for their high school program.[2] Although the consequences of this aggregation for conclusions about differences between tracks cannot be known, it seems likely that it would tend to reduce them.[3] Somers (1971) acknowledges that his conclusions must be viewed in light of a very high non-response rate (about 60%), the absence in most of the analyses of academic and general track students, and a relatively small sample size.

The evidence suggests that these non-college tracks do differ, but more work is needed to enhance our understanding of the differences between them and the role that curriculum plays in the educational process. Moreover, the research which led to the conclusion discussed earlier--that the effects of differential attendance in a college or non-college track are among the most important factors influencing later educational attainment--did not take into account the differential effects of these "other" tracks, and might thus be underestimating the importance of high school curriculum in the attainment process (Sorenson, 1978). Indeed, given the importance of the college/non-college track distinction, even the relatively small effects of finer track distinctions may well prove significant. By comparing a model of educational attainment which includes detailed measures of curriculum to one which employs the traditional college/non-college distinction, we can, first, determine more precisely the size and nature of non-academic curriculum differences and, second, test the adequacy of the conventional classification of curricula.

Data and Variables

The data for this analysis are taken from the National Longitudinal Study of the High School Senior Class of 1972 (NLS). The population con-

sisted of all 1972 twelfth graders enrolled in all public and private schools in the fifty states and the District of Columbia. This study employed a two-stage stratified sample, selecting first on high schools and then on students within the chosen schools. In order to increase the number of disadvantaged students in the sample, schools located in low-income areas and schools with high proportions of minority group enrollments were sampled at approximately twice the sampling rate for the remaining schools.

The base year survey was administered in the Spring of 1972 and follow-ups were fielded during the early Winter of 1974 and again in 1975. Both follow-ups had high response rates of approximately 94%. My use of this data is limited however to the black and white respondents from this sample who had no missing data. Those with incomplete information and other ethnic or racial groups besides whites and blacks were excluded from this analysis.

For the most part, the variables employed in this analysis are straightforward. Four variables are used as indicators of respondent's background status: a household item index (HHI) consisting of the sum of responses to ten questions about the presence or absence in the home of such items as televisions, newspapers, etc. (coded 1 if present, 0 if absent), a measure of mother's (MED) and father's (FED) education in years of school completed, and father's occupational status in Duncan SEI scores. The effects of these four variables are summarized by a sheaf coefficient (SES) in the tables in order to facilitate discussion (Heise, 1972). The respondent's race (RACE) and sex (SEX) are included with blacks and females coded 1, whites and males, 0. Aptitude (APT), which is measured by a test battery administered with the base year instrument, and class

rank (RANK), taken from school records and coded in deciles, are employed as intervening variables in the analysis (see Figure 1).

Two measures of curriculum are used in this analysis. The first (CUR2) corresponds to that ordinarily employed in work of this type: It is a dichotomous dummy variable coded 0 if school records indicated that the respondent was in an academic curriculum in his/her senior year, and 1 if s/he was not.[4] The other measure of curriculum (referred to as CURI) consists of a set of seven dummy variables. Each dummy variable corresponds to one curriculum and is coded 1 if the respondent is in that track, 0 otherwise. These curricula are Agricultural (AG), Business (BUS), Distributive Education (DIST), Health Occupations (HEALTH), Home Economics Occupations (HOME), Trade or Industrial Occupations (TRADE), and General (GEN). Those students enrolled in the college or Academic track (ACA) are coded 0 on all seven dummies and thus represent the reference group to which other students are compared. This list of curricula is not exhaustive but it clearly captures the major curriculum distinctions employed by researchers and high schools (see Note 2). Only 233 out of the 14,249 respondents could not be assigned to one of these curricula from school record information and all but 8 of the 233 were codable from self-reports.[5] Further, only 10% of the schools surveyed reported having students in any other curriculum, and the proportion of these students in all but 10 of the 1318 high schools surveyed relative to those in the curricula used here was very small.

The last variable is a measure of educational attainment (TYPE), coded 0 if the respondent never attended any college, 1 if s/he ever attended vocational school, 2 if the respondent ever attended a community (two-year) college, and 3 if the respondent ever attended a four-year college or university before late 1975. It should be noted that the TYPE variable is

an ordinal variable; consequently, its use as an interval variable might lead to distorted results (Mayer and Robinson, 1977). Careful comparison with dummy variables generated from TYPE and used as dependent variables in regressions in its stead reveals that this is not the case, however. Beta weights for TYPE were slightly larger than those for the dichotomous dummies (as one would expect) but had substantially the same relationship to one another. Consequently, the use of TYPE seems allowable in this instance.

Analysis and Discussion

Table 1 provides some basic information about the high school curricula. The Academic curriculum is by far the most populous, with almost one-half (44%) of all senior students being enrolled in it, while the General curriculum contains another one-third of the students (31%). The remaining one-quarter of the student sample is distributed unevenly among the Vocational curricula,[6] with approximately 80% in the Business and Trade curricula. (Only 4.9% of the seniors are enrolled in the remaining four Vocational curricula.)

The central rows of the table give the sex composition of these tracks (the terms "curriculum," "track," and "program" are used synonymously in this paper). The Trade and Agriculture curricula are mostly male while the Business, Health, and Home Economics tracks are mostly female. The remaining tracks (Academic, General, and Distributive Education) are split about fifty-fifty. This sex distribution is extremely suggestive. Among other things it might well point to sex discrimination in the high school (see Barnett, 1977 for other instances of this). Further, it strongly indicates that differential educational training may help generate the well-known phenomenon of "male" and "female" occupations (Evans and Galloway, 1973; Grasso, 1978; Kaufman, 1975, 1976; Oppenheimer, 1970). Thus a possible

path towards sexually integrating occupations may be through integrating the predominantly single-sexed curricula, though Grasso (1978) suggests this might not improve the labor market position of women.

Females tend to be over-represented in the Vocational tracks and under-represented in the General curriculum by about 10%. This is true in the opposite direction for males. This sex distribution becomes interesting when one notes that General track students tend to have a somewhat higher level of educational attainment than do Vocational track students (see Table 2 and discussion below). At the same time males also tend to have a somewhat higher level of attainment than do females (Alexander and Eckland, 1974; Sewell and Shah, 1967). Thus a likely explanation for a significant part of this sex difference in attainment may well be the differential distribution by sex between the Vocational tracks and the General track (or the sex distribution may explain the differential effects of the curricula).

For the racial composition of the curricula, Table 1 indicates not surprisingly, that blacks are greatly under-represented in the Academic curriculum (8.6%, versus 15.2% in Vocational and 19.7% in the General curriculum). Membership in the Academic track has strong positive consequences for future educational attainment (see Table 2) and thus black under-representation there undoubtedly contributes to their lower attainment vis-a-vis whites. On the other hand, as Table 3 will illustrate, net of other background characteristics, being black promotes enrollment in the Academic curriculum, and hence curriculum choice represents one mechanism whereby blacks out-achieve whites, other things being equal (Portes and Wilson, 1976; Thomas, Alexander and Eckland, 1977). Further along this line, Table 1 shows that non-Academic track blacks tend to concentrate in three curricula: Health, Home Economics, and General (23.8%,

36.3%, and 19.7%, respectively). Outside the Academic track, these are the three tracks whose members have the highest levels of educational attainment.[7] While one cannot be sure that it is not the presence of larger numbers of blacks in these curricula which accounts for these tracks' attainment advantages, it does seem likely, given the small percentage of blacks in these tracks, that in fact their enrollment in these curricula contributes to blacks' out-attaining whites.

Table 1 About Here

Table 2 shows college attendance differences for the various high school curricula. A relatively neat pattern of college attendance emerges: students in the Vocational tracks tend to enroll in the least prestigious types of colleges (or none); General students tend to do somewhat better and, at a long remove, Academic track students tend to enroll predominantly in four-year colleges or universities. A clear exception to this pattern is the Health curriculum, whose students actually out-place those of the General curriculum at all levels except the four-year, and whose mean level of attainment exceeds that of the General track (2.1 versus 2.0). In addition to types of school attended, Table 2 shows the level of enrollment students expected to achieve while in their senior year of high school. In comparing expectations to achievements two striking patterns appear. First, expectations seem adjusted by track. Vocational students have the lowest mean expectations followed by General and then Academic students. Concomitantly, the gap between expectations and reality is remarkably stable over almost all curricula (approximately .4).[8] Distributive Education students seem likely to be the most disappointed in their attainment (22.6% expect to attend a four-year college but only 6.9% do so), while those enrolled

in Home Economics, having apparently adjusted their expectations downward (to 1.8), would seem likely to be the most satisfied with their placement in college. General curriculum students also seem to have overly high expectations in light of their attainment, especially those planning to attend four-year colleges.

Table 2 About Here

Table 2 confirms that although the major break occurs between the college and non-college tracks, substantial differences still exist between other curricula as far as college enrollment and educational plans are concerned. Table 1 suggests that these differences may help explain black-white and male-female attainment differences. More powerful techniques are required for exploring these issues. To that end, the model below will be analyzed using analysis of covariance techniques. First this model will be run using a dichotomous measure of curriculum enrollment (CUR2), and then the results of these regressions will be compared to those obtained from employing the set of dummy variables (CURI) which detail curriculum placement. (The location of CUR2 and the CURI dummies is indicated by the symbol CUR.) The model itself is intentionally simple and designed to fit

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Figure 1 About Here
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into the mainstream of attainment research. (See, for instance, Sewell and Hauser, 1976.) No attempt is made, however, to separate the between-school and within-school components of curriculum effects. Given our purposes here, the source of curriculum differences is simply not to the point. Whether they occur within or between schools, the results of

curriculum differentiation are still curriculum effects and may be legitimately treated as such.

Tables 3 and 4 present the data from the analyses using CUR2 and CURI, respectively. For the CUR2 analysis, main effects were of course found to be both large and significant when equations including this variable were contrasted to those equations with CUR2 deleted. Interaction effects were also tested for: They were significant at the .01 level, but were substantively miniscule (the increase in R^2 for line 10, for example, was only .001 to .385). This small interaction suggests that virtually all the consequences of curriculum tracking (for academic versus non-academic tracks) are additive and are captured by Table 3. Stated substantively, this suggests that one curriculum is not favored over the other for any of the other variables in the model; that is, having a high SES is likely to have the same effect regardless of the curriculum a student is in.

Table 3, row 9 shows that the total effect of being in the college curriculum on the kind of college education a student receives is .358. This is .956 in metric terms (line 19), which suggests that being in a college curriculum has very powerful effects since such enrollment tends to raise a student almost a whole level of TYPE (i.e., from 2-year to 4-year college) by itself, when compared with students enrolled in other curricula. The strength of differential track enrollment can be assessed from another viewpoint by noting that its effects on TYPE are only slightly weaker than the unmediated effects of aptitude (.425, line 8) and SES (.389, line 7). Further, CUR2 absorbs a good deal of the effects of ability and background, almost halving APT to .237 (line 9), and reducing SES from .258 (line 8) to .203. Observing also that the addition of a student's rank in class in line 10 does little to reduce the power of CUR2, it can be seen that

curriculum enrollment has by far the strongest direct effects on TYPE of any variable in the model. In sum we may conclude along with the research cited earlier in this paper that whether a student is enrolled in the college curriculum or some other in his/her senior year of high school is a major determinant of educational attainment, serving both to mediate the influence of other variables and to uniquely induce variance in educational attainment.

Table 3 About Here

In Table 4, the curriculum main effects for all CURI dummies entered together are large and significant for all of the equations in which they appear. Interaction effects are significant at the .01 level and are somewhat larger than the CUR2 interactions (as one might expect from the larger number of interaction terms needed in this version of the model), but are still substantively small and without any clear pattern. (The R^2 for line 10 shows the largest increase, only .004 to .394, when interactions are included in the model.) Thus the conclusions drawn from these data are unlikely to change substantially when within-curriculum data, which capture the combined additive and interactive effects of curriculum, are examined. Sorenson (1978) argues that within track environments ought to be important due to differential opportunities for learning between tracks. The lack of interactions found here tends to refute this argument, suggesting with Jencks and Brown (1975) and Alexander, Cook, and McDill (1978) that within-track differences are likely very small, and that grouping does not create what Sorenson (1978:60) calls "different educational environments."

Proceeding directly to the CURI dummies, there are fairly substantial differences between the curricula in promoting both class rank and college attendance net of other variables. From lines 10 and 13[9] we can get an

idea of the size of these differences and of the ranking of the curricula. The dummy b's indicate the within group means for RANK or TYPE for the various tracks relative to the constant term, which represents the predicted value for the suppressed group--in this case the Academic curriculum. Taking TYPE first, students in non-academic tracks tend to drop between .7 and 1.2 levels of TYPE when compared to their Academic counterparts, a spread which is almost as large as the difference between blacks and whites for TYPE.[10] Recalling that CUR2 results suggested approximately a one level drop for these students as a whole, and noting that the spread between non-academic curricula is one-half as great as this, suggests that non-academic curriculum differences are substantial and deserve to be further studied.[11]

Ranking the curricula for promoting educational attainment as measured by TYPE, the proximity of the b's suggests the following (in descending order): 1) Academic, 2) Health, 3) General, 4) Home Economics and Agriculture, 5) Business, Trade, and Distributive Education (see Figure 2). The addition of RANK (line 14) has no effect upon this rank ordering and only marginal effects upon the magnitude of the coefficients.

These curricula rank very differently in their effects on promoting class rank. General track students receive on the average the lowest class rank, while Business students have among the highest (excluding the Academic track), again net of other variables. The impact of curriculum is not as great on class rank as it is on college attendance, though it is still appreciable. A student's presence in the Academic curriculum is likely to boost his/her class rank about 10% (Table 3, row 16) over students in the other tracks, while between non-academic tracks the range is about 6% (the average difference between the Health track which promotes the highest class ranks and the General track whose enrollees tend to rank the

lowest). Once again these figures suggest that there are differences among the non-academic tracks in their effects on promoting class rank, though the major cutting point lies along the Academic/non-academic split.

Thus the suggestion advanced in the introduction that there should be moderate differences between the non-academic curricula is amply confirmed by the data. The second issue raised there was to what extent these differences are important in general for models of attainment. Loosely stated, I hypothesized that the additional information contained in employing detailed curriculum measures in a model of attainment should improve the model. The obverse side of this hypothesis is that by comparing the dichotomous and detailed models, the adequacy of the curriculum measure used by most attainment researchers (the dichotomous) could be assessed. Restating this in empirically verifiable terms, should the use of CURI result in a substantial increase in the amount of variance explained by the model when compared to CUR2 results or should its employment cause a substantial change in the values of other variables in the model (thus indicating that the use of CUR2 is producing biased results), then this would indicate the importance of making distinctions among non-academic tracks. It would further suggest (depending upon the strength of the results) that CUR2 might not be the appropriate variable to employ in attainment research.

The evidence demonstrates that employing the set of CURI dummies does not have much impact on this attainment model. With two exceptions, none of the variables in the CUR2 model change values more than a negligible amount. Even for the two exceptions (race and sex) the amount of change is too small to lead one to justify urging general usage of the CURI dummies because of biased estimates from CUR2. Still the changes in the race and sex variables are large enough, given the current interest in race and sex

differences in attainment, to be worth dwelling on momentarily.

Comparing Table 3, line 20 to Table 4, line 14, it can be seen that the CURI model shows black attainment as closer to white (.573 to .542) and female closer to male (-.146 to -.132). Although neither of these differences is substantively large, relative to the size of the race and sex differences they are noteworthy. These data indicate that conventional attainment models are likely over-estimating the degree to which blacks outattain whites by some 5.5%.[12] Bearing in mind the small number of blacks enrolled in non-academic curricula gives this change more salience, suggesting that non-academic track enrollment can have considerable impact on attainment. For females the bias resulting from using CUR2 is larger than for blacks, overestimating the difference between male and female attainment by about 10%. While this does seem a substantial reduction, it is even more striking when Table 3, line 19 and Table 4, line 13 are compared; here the male-female differential drops some 20%. The difference between lines 20, 14 and 19, 13 is due to the offsetting effects of RANK. In keeping with other research (Alexander and Eckland, 1974), the data indicate that females tend to have higher class ranks than males (Table 4, line 10 or Table 3, line 16--note that the use of CURI indicates that this difference is somewhat overestimated in conventional models), thus the addition of RANK in line 20 results in a reduction in female attainment vis-a-vis males given females' higher high school ranking. For females in the non-academic tracks, this reduction is moderated by the concentration of women in curricula which promote higher attainment (see Tables 1 and 2).

Bearing in mind that the introduction of the CURI dummies causes no other substantial changes, we should note also that although their use

does significantly increase the R^2 of the equations in which they appear over the same equations run with CUR2 as the curriculum indicator, the largest of these increases is only 6%. This is hardly substantial enough to warrant the wholesale inclusion of this set of dummies in the model (compare Table 3, line 10 and Table 4, line 7; the R^2's are .384 and .390 respectively). We may conclude from these comparisons that <u>in general</u> the use of CUR2 is appropriate in attainment models when compared to more detailed measures of curriculum placement.[13] But, as noted earlier, the size of the differences between non-academic curricula suggests that studies which center on high school effects on attainment should incorporate the CURI dummies where the data permit.

Table 4 About Here

<u>Conclusions</u>

We are left with a seeming paradox. On the one hand we find that there are differences in the consequences of differential enrollment in non-college curricula for later educational attainment as measured by TYPE. On the other hand, these differences are almost completely explained by an attainment model that employs a dichotomous curriculum measure which distinguishes only between college and non-college track students.

This paradox vanishes when the situation is viewed from the perspective suggested by Figure 2. In the figure, the difference between the attainment of Academic and grouped non-Academic track students is scaled as one unit, from 1 to 0; the range between the non-Academic curricula is portrayed as half this difference (from HEALTH to DIST, the endpoints of the distribution), as the data in Tables 3 and 4 suggest. By assuming that the grouped non-

Academic track provides a weighted estimate of the individual non-Academic tracks, the relative positions of all curricula can be portrayed. It is apparent from the diagram that non-Academic track students, regardless of track, have a very low average level of attainment compared to their Academic counterparts. Thus, compared to knowing whether a student is in the Academic track or not, the knowledge of which non-Academic track s/he is in does not help as much in predicting his/her attainment. This remains the case even though there are substantial differences among non-Academic curricula. Thus the incorporation of these distinctions into an attainment model does not substantially differentiate that model from one which distinguishes only between Academic and non-Academic track students.

Figure 2 About Here

The sufficiency of employing a dichotomous measure of high school curriculum placement has been explored here for the TYPE variable only. It seem likely, however, that the conclusion reached above will remain robust when the other dependent variables ordinarily employed in attainment research are examined. There is no reason why non-college track students' other attainments should rise relative to academic students', nor why the differences between students in different non-college curricula should dramatically increase. Moreover, much of the effect of curriculum is likely to be exhausted once its influence on college attainment is accounted for (see, for example, Alexander and Eckland, 1975, who demonstrate this for the dichotomous case), so the direct impact of any curriculum variable on later life chances is likely to be very small. Total effects should also be lessened due to the influence of other factors not perfectly correlated with curriculum placement on these later outcomes.

Although the inclusion of non-academic track curriculum information into an attainment model is not likely to increase the R^2 of that model, this does not suggest that the differences between non-college tracks are of no consequence and should be ignored. Such differences were found to be sizable, and their existence suggests some interesting questions for further study. Why, for instance, does enrollment in different non-college curricula have differential effects on attainment? (Indeed, why curriculum differentiation itself has important consequences is still an open question--see Sorensen, 1970, 1978; and Meyer, 1977). Or, why do the different curricula rank as they do on attainment? These same questions arise for class rank, and the reasons behind the differing consequences of tracking for class rank and attainment seem an especially salient issue for further exploration.

Also, the relationship of curriculum enrollment, educational and occupational goals, self-concept, and other relevant variables needs to be established, and the causal mechanisms for these relationships delineated. Then too, a better understanding of the relationship of curriculum to race and sex certainly seems called for.

In sum, researchers whose interests lie in areas of the attainment process not directly concerned with high school or curriculum placement can use a dichotomous measure of curriculum as a proxy for the detailed measure with little loss of precision or explanatory power. However, researchers interested in a fuller understanding of how the contingencies of peoples' high school careers operate in the attainment process (or those concerned with racial and sexual differences in attainment) ought to incorporate non-academic track distinctions into their analyses, given the magnitude of the differences found to lie between these tracks. Simply stated, a variable distinguishing only between college preparatory and other tracks

is quite acceptable when employed as a control in an analysis which is directed to other issues, but researchers whose theoretical concerns center on areas related to high schools and their effects should properly incorporate a detailed measure of curriculum placement into their research designs.

Footnotes

1. It does not follow from the argument about within-school effects that one should look at college/non-college track differences only, nor does Heyns make clear why only this distinction was studied in her paper.
2. There are eight generally recognized high school curricula (Gilli, 1976; Kaufman, 1968; Somers, 1971).
3. Grasso and Shea (1977) expect that their results are understated due to time span and sample limitations (p. 2.46). These factors might well interact with the effects of aggregation to further reduce their estimates of between track differences.
4. This reversal of normal coding conventions (1 for Academic track, 0 for other tracks) complicates the interpretation of this model somewhat, but greatly facilitates comparison to the model which employs CURI as a curriculum variable.
5. Most of the research cited in this paper has relied on self-reported curriculum reports rather than school record reports. The correlation between the two is notoriously low (at least for NLS) -- for all eight curricula it is only .45, for college vs. others, .63. One cannot say with any certainty why these large differences exist, nor which measure is more "accurate." Grasso and Shea (1977) suggest that self-reported curriculum is a measure of the student's orientation to high school while school records capture the content of his/her studies. Thus they conclude that self-reports are likely to be inappropriate to investigate the effects of a program of study.

Similar reasoning motivated the choice of source of curriculum information here, but I can find no compelling rationale for either choice, hence analyses parallel to those conducted here were performed for student reported curriculum and also for students whose self-reported and school record curriculum enrollments agreed (i.e., those whose track placement was "accurately" determined). The results of these analyses are not different enough from those reported in the body of this paper to alter the substantive conclusions drawn here.

Because researchers often have only a single indicator of curriculum, this similarity between self-reported, school record and composite curriculum measures is fortuitous, suggesting that the source of curriculum information is not likely to have much impact on the results of analyses in which such a measure is employed.

6. The term "Vocational track" is used in this paper to refer to all tracks except General and Academic.

7. The higher attainment of Home Economics students is not reflected in Table 2. See Table 4 for evidence of this.

8. The question of how expectations and track selection relate -- which causes which -- is clearly raised by this finding. There probably is no simple answer, as the work of Alexander and Cook (1978) demonstrates.

9. Note that row 7, which presents these same data in standardized form, gives an entirely different picture of the various curricula's effects than the metric data do. This is due to the sensitivity of the betas to variance differences in the data; in this case, the large variation in the number of pupils enrolled in different curricula seems to be the chief cause of this difference. Thus the standardized

coefficients for the CURI dummies are uninterpretable and will not be discussed.

10. To translate this finding into a metric which lends itself more readily to interpretation, the same analysis was conducted using years of education attained beyond high school (AF3) as a dependent variable. The results obtained parallel those just reported in the text and those which will be discussed below. For CUR2, non-college track students trailed their academic counterparts by .85 years, while the difference between non-college curricula is about half this or .4 years. At the time of this analysis, NLS data extended only 3 years beyond high school which, although leaving the relationship between the attainment of the various curricula unchanged, will likely reduce the actual number of years of attainment for all students. (It was this problem, in part, which prompted my choosing TYPE as a dependent variable rather than AF3.) To arrive at a crude estimate of the difference between these groups four years after high school, I assumed that the differences in attainment were constant from year to year. Thus a per year difference could be arrived at, which, when multiplied appropriately, yielded a CUR2 difference of 1.13 years between college and non-college track students, and a .53 years spread for the non-college tracks. These numbers are directly comparable to those generated using TYPE as a dependent variable.

11. Perhaps the most noteworthy difference between self-reported, school record and composite curriculum measures (see Note 5) is that the school record information used here produces the smallest estimate of the size of non-academic track differences relative to the Academic

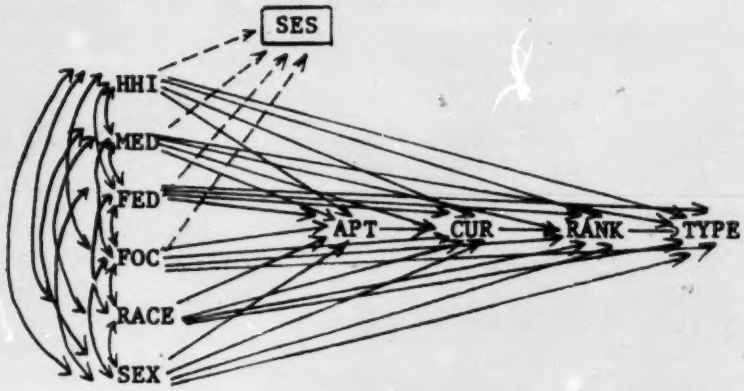
track/other difference. For the students whose self- and school reports were in agreement, the non-college spread was over two-thirds as large as the CUR2 difference.

12. This finding is in keeping with the evidence presented in Tables 1 and 2 earlier. If blacks are concentrated in non-Academic curricula which promote higher attainment, this will show up as an unaccounted-for difference in the CUR2 model; a difference which the CURI model will be able to "explain," thus reducing the size of the race coefficient. This is also the case for male-female differences discussed below.

13. A trichotomous variable which distinguished among the Vocational, General, and Academic curricula was also tested. Its effects on the model were virtually nil. This implies that the small improvement in R^2 due to the CURI dummies is the most one could expect from any combination or scaling of these data. This conclusion is further bolstered by noting that all the non-Academic dummies' values are located within a constricted range. Thus there are no anomalies or outliers to complicate the conclusion that the college/non-college distinction is sufficient as far as explained variance is concerned.

FIGURE 1

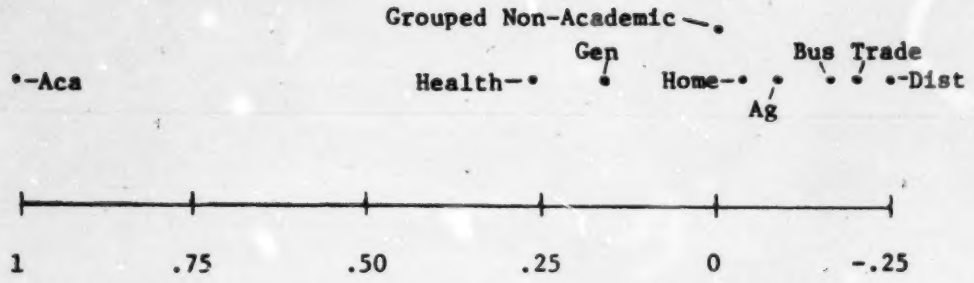
Path Model for Educational Attainment*



*See text for variable descriptions.

FIGURE 2

Relative Location[a] of Curricula for TYPE[b]



[a]Distances are approximate.

[b]See text for explanation of symbols.

Table 1

Race and Sex Composition of High School Curricula[a]
(Percent)

Percentage Within Curriculum	Curriculum									
	Ag	Bus	Dist	Health	Home	Trade	Voc	Gen	Ada	All Currics
RACE										
Black	13.1	13.3	14.4	23.8	36.3	14.8	15.2	19.7	8.6	13.7
White	86.9	86.7	85.6	76.3	63.7	85.2	84.8	80.3	91.4	86.3
SEX										
Female	3.8	91.3	51.0	93.8	94.6	8.3	56.8	46.1	50.0	50.4
Male	96.2	8.7	49.0	6.3	5.4	91.7	43.2	53.9	50.0	49.6
Percentage of Total Enrollment	1.3	11.6	1.8	0.6	1.2	8.0	24.5[b]	31.2	44.3	100.0
(N)	(183)	(1659)	(263)	(80)	(168)	(1140)	(3493)[b]	(4443)	(6305)	(14241)

[a]For meaning of symbols see text.

[b]Not included in total.

Table 2

Type and Mean Level[a] of College Attended, Educational Plans, and Mean Level of Plans by Senior Curriculum Enrollment[b]

(Percent)

Post-Secondary Level	Curriculum								
	Ag	Bus	Dist	Health	Home	Trade	Voc	Gen	Aca
NONE									
Attend	68.2	63.7	70.1	44.3	67.1	69.1	65.9	54.1	16.6
Expect	40.2	44.0	41.7	21.1	44.8	36.2	40.8	28.2	5.1
VOCATIONAL									
Attend	12.8	14.6	11.5	21.5	12.4	12.5	13.7	12.3	6.1
Expect	34.2	29.3	26.2	36.8	35.4	38.4	32.8	26.5	8.6
TWO YEAR									
Attend	12.8	12.2	11.5	17.7	13.0	11.6	12.2	15.1	13.3
Expect	9.4	13.5	9.5	15.8	9.4	11.5	12.3	15.0	10.0
FOUR YEAR									
Attend	6.1	9.4	6.9	16.5	7.5	6.8	8.3	18.5	64.1
Expect	16.2	13.3	22.6	26.3	10.4	12.9	14.2	30.4	76.3
MEAN									
Attend	1.6	1.7	1.5	2.1	1.6	1.6	1.6	2.0	3.2
Expect	2.0	2.0	2.1	2.5	1.8	2.0	2.0	2.5	3.6

[a]Mean calculated by coding college attended or expected so that None = 1, Voc = 2, Two Year = 3, Four Year = 4, and then multiplying by appropriate percentages. Thus, a mean of 1.5 indicates a position half-way between none and vocational school in this "hierarchy".

[b]See text for meaning of symbols.

Table 4

Metric and Standardized Reduced Form and Structural Coefficients for Figure 1: CURI Used as Curriculum Variable[a]

Dependent Variables	Independent Variables -- STANDARDIZED																ADJ
	HH1	MED	FED	F	RACE	SEX	SES	APT	GEN	AG	BUS	DIST	HEALTH	HOME	TRADE	RANK	R^2
(1) RANK	-.010	.076*	.072*	.044*	-.064*	.222*	.154										.076
(2) RANK	-.027*	-.008	-.006	-.018*	.104*	.207*	-.045	.605*									.365
(3) RANK	-.037*	-.012	-.015	.026*	.087*	.197*	-.070	.5*	-.188*	-.036*	-.075*	-.046*	-.017*	-.035*	-.082*		.388
(4) TYPE	.097*	.136*	.152*	.130*	.068*	-.019*	.389										.144
(5) TYPE	.085*	.077*	.099*	.086*	.186*	-.029*	.258	.425*									.286
(6) TYPE	.067*	.062*	.071*	.065*	.137*	-.021*	.197	.234*	-.289*	-.084*	-.270*	-.115*	-.038*	-.081	-.220*		.378
(7) TYPE	.072*	.064*	.073*	.069*	.124*	-.049*	.207	.161*	-.262*	-.079*	-.260*	-.108*	-.036*	-.076	-.208*	.143*	.390

	Independent Variables -- METRIC															
	HH1	MED	FED	FOC	RACE	SEX	APT	GEN	AG	BUS	DIST	HEALTH	HOME	TRADE	RANK	CONST
(8) RANK	-.016	.069*	.049*	.005*	-.568*	1.21*										3.94
(9) RANK	-.043*	-.007	-.004	-.002*	.926*	1.13*	.052*									-4.81
(10) RANK	-.060*	-.011	-.016	-.003*	.771*	1.08*	.044*	-1.12*	-.911*	-.634*	-.947*	-.621*	.910*	-.864*		-2.31
(11) TYPE	.076*	.061*	.051*	.007*	.294*	-.050*										-.729
(12) TYPE	.067*	.034*	.033*	.005*	.808*	-.078*	.018*									-3.74
(13) TYPE	.052*	.027*	.024*	.004*	.596*	-.057*	.010*	-.847*	-1.04*	-1.12*	-1.17*	-.700*	-1.02*	-1.13*		-1.21
(14) TYPE	.056*	.028*	.025*	.004*	.542*	-.132*	.007*	-.769*	-.977*	-1.08*	-1.10*	-.657*	-.960*	-1.07*	.070*	-1.05

[a]See text for meaning of symbols.

*Indicates coefficients are at least 1.96 times standard error.

Table 3

Metric and Standardized Reduced Form and Structural Coefficients for Figure 1: CUR2 Used as Curriculum Variable[a]

Dependent Variables	Independent Variables										
	HH1	MED	FED	FOC	RACE	SEX	SES	APT	CUR2	RANK	ADJ R^2
Standardized (N = 12333)											
(1) APT	.027*	.139*	.129*	.103*	.278*	.025*	.314				.213
(2) CUR2	-.071*	-.109*	-.132*	-.106*	-.026*	-.005	-.318				.105
(3) CUR2	-.057*	-.035*	-.064*	-.051*	-.120*	.008	-.155	-.526*			.322
(4) RANK	-.010	.076*	.072*	.044*	-.064*	.222*	.154				.076
(5) RANK	-.027*	-.008	-.006	-.018*	.104*	.207*	-.045	.605*			.365
(6) RANK	-.037*	-.014	-.018	-.027*	.083*	.208*	-.072	.512*	-.176*		.385
(7) TYPE	.097*	.136*	.152*	.130*	.068*	-.019*	.389				.144
(8) TYPE	.085*	.077*	.097*	.086*	.186*	-.029*	.258	.425*			.286
(9) TYPE	.065*	.064*	.074*	.068*	.143*	-.026*	.203	.237*	-.358*		.372
(10) TYPE	.070*	.066*	.077*	.071*	.131*	-.055*	.212	.167*	-.333*	.136*	.384
Metric (N = 12333)											
	HH1	MED	FED	FOC	RACE	SEX	APT	CUR2	RANK	CONSTANT	
(11) APT	.504*	1.47*	1.03*	.142*	-28.74*	1.56*				168.29	
(12) CUR2	-.021*	-.018*	-.016*	-.002*	-.043*	-.005				1.20	
(13) CUR2	-.017*	-.006*	-.008*	-.001*	-.195*	.008	-.008*			2.59	
(14) RANK	-.016	.069*	.049*	.005*	-.568*	1.21*				3.94	
(15) RANK	-.043*	-.007	-.004	-.002*	.926*	1.13*	.052*			-4.81	
(16) RANK	-.059*	-.013	-.012	-.003*	.739*	1.14*	.044*	-.964*		-2.31	
(17) TYPE	.076*	.061*	.051*	.007*	.294*	-.050*				-.729	
(18) TYPE	.067*	.034*	.033*	.005*	.808*	-.078*	.018*			-3.74	
(19) TYPE	.051*	.029*	.025*	.004*	.622*	-.070*	.010*	-.956*		-1.26	
(20) TYPE	.055*	.029*	.025*	.004*	.573*	-.146*	.007*	-.892*	.067*	-1.10	

[a]See text for meaning of symbols.

*Indicates coefficients at least 1.96 times standard error.

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